BACHELOR OF SCIENCE
DATA SCIENCE

Prepare for a career in a high-demand field!

"Big Data" is everywhere! All industries rely on and use data to make important decisions – it's not just tech companies like Google or Facebook that need skilled employees who can work with data. Manufacturers need to understand the demand for their product and the shopping habits of their customers. The service sector needs to understand product variations and pricing – for example, airlines that need to schedule different routes and different pricing option for a single flight. Retailers need to understand traffic patterns of in-store shoppers to site new locations. Consulting firms need to crunch data related to the behavior of voters, future college students, or consumers of news so they can best advise their clients. And of course tech companies need to understand the browsing styles of online users. If you aspire to a career mining data using mathematical and computer models, the data science major is a good choice for you.

WHAT DO DATA SCIENTISTS DO?

Data scientists give structure to large volumes of unstructured data, generating new information from existing dats. They create the models and algorithms to mine big data, and they identify which sources of big data would best answer the questions at hand. They may also take the output of raw data that results from their models and create additional models to look for patterns, trends and meaning. Finally, they may create visualizations to convey their findings to decision-makers. In larger companies, these latter tasks of interpretation and communication may fall to a data analyst instead of a data scientist.

A data scientist may work within a government agency to predict how an economic policy initiative will impact the unemployment rate in various regions. A data scientist may work with Amazon to detect buying patterns among certain demographic groups and make recommendations for marketing promotions. Or, a data scientist may work in a healthcare organization helping to create an app that uses artificial intelligence to assess self-reported medical symptoms.

HOW IS THE DATA SCIENCE MAJOR DIFFERENT FROM THE DATA ANALYTICS MAJOR?

Data analysts and data scientist fill related and complementary positions in a company and must work closely together. Students that choose data science will take signifiantly more math and computer science and will focus on modeling and algorithms. In their career, their job duties will be mostly related to programming. In contract, the data analytics major does still require some calculus and programming but not to the same extent. The data analytics program includes more elements that focus on how to interpret data and create communication tools to summarize results. Specifically at UWM, our data analytics major allows students to specialize in analysis within the context of specialized industries such as health care, the sciences, or tech. Students who are more interested in the analysis side of big data may want to explore the data analytics major instead.

JOB OUTLOOK

According to a report from the employment outlook firm Burning Glass, there are currently 1,066,354 employed data analysts and 61,799 data scientists in the American workforce. The U.S. Bureau of Labor Statistics estimates that over the next ten years the number of positions for data scientists will grow by 20% while the number of openings for data analysts will grow by 25%.

DATA SCIENCE REQUIREMENTS

The undergraduate major in Data Science is a collaboration between the College of Letters & Science and the College of Engineering and Applied Science. Successful students will enjoy problem-solving, math and computer programming. To complete the program in four years, students must begin the program ready to start in pre-calculus or higher-level math. By the time they graduate, students will:

1. be able to integrate methods and concepts from mathematics, statistics and computer science to solve data science problems, including data management and extraction of meaning from data

2. demonstrate critical thinking related to data science problems and concepts

3. demonstrate oral and written communication skills related to data science

4. demonstrate awareness of the ethical aspects of data science

The major requires a minimum of 60 credits consisting of:

Course #	Course Title	Course #	Course Title
Math 231	Calculus and Analytic Geometry I	MthStat 566	Computational Statistics
Math 232	Calculus and Analytic Geometry II	MthStat 568	Multivariate Statistical Analysis
Math 233	Calculus and Analytic Geometry III	CompSci 317 or Math 341	Discrete Information Structures or Introduction to the Language and Practice of Mathematics
Math 234 or 240	Linear Algebra and Differential Equations or Matrices and Applications	CompSci 351	Data Structures and Algorithms
CompSci 250	Introductory Computer Programming	CompSci 395 or Philos 237	Social, Professional, & Ethical Issues or Technology, Values, and Society
CompSci 251	Intermediate Computer Programming	CompSci 411 or CompSci 425	Machine Learning and Applications or Introduction to Data Mining
MthStat 215 or 216	Elementary Statistical Analysis or Intro to Statistical Computing and Data Science	CompSci 422	Introduction to Artificial Intelligence
MthStat 361	Intro to Mathematical Statistics I	CompSci 557	Introduction to Database Systems
MthStat 362	Intro to Mathematical Statistics II	English 310	Writing, Speaking, and Technoscience in the 21st Century
MthStat 563	Regression Analysis	MthStat 489 or Math 489 or Math 599 or CompSci 595 or CompSci 599	one capstone experience

The remaining credits include electives and general education requirements to reach a total of 120 credits.

For the BS in Data Science, students must complete these university general requirements, portions of which are already included amidst the major requirements:

- 6 credits humanities (Philos 237 if chosen above counts as 3 credits of humanities; English 310 counts as 3 credits of humanities)
- 6 credits of social science
- 6 credits of natural science, including at least one lab (Math 231 counts as four credits of natural science)
- 3 credits of cultural diversity
- 3 credits of arts
- English 102 and an approved advanced writing course (English 310 is an approved advanced writing course)
- College algebra and a 200-level math class (completion of Math 231 satisfies the math requirement)
- 2 units of world language other than English; this requirement can be satisfied with two years high school language or two semesters of college language.